

PATENT ABSTRACTS OF JAPAN

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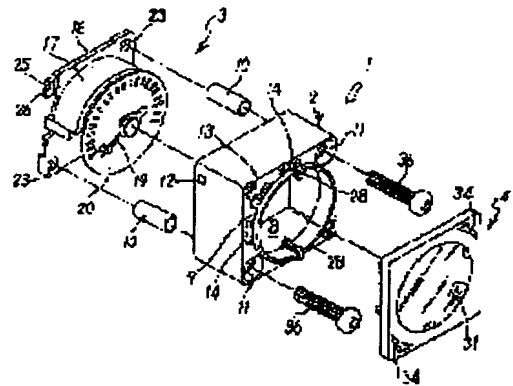
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(21)Application number : 06-224310 (71)Applicant : SMC CORP  
(22)Date of filing : 25.08.1994 (72)Inventor : NARA YUKI

(54) BOURDON PRESSURE GAGE

(57)Abstract:

PURPOSE: To obtain a Bourdon pressure gage being free from drop or loss of a fitting screw.  
CONSTITUTION: A case 2 of a Bourdon pressure gage 1 has a holding part 6 of an interior instrument 3, a window hole 8, space tubes 10 through which fitting screws 36 are inserted, counterbores 11 in front of the tubes, and a circular-arc-shaped fitting hole 13, while a cover 4 has transparent displays 34 being opposite to the counterbores and an engagement piece 31 having an engagement part. The cover is fitted removably to the front of the case 2 by engagement of the engagement part passing through an extended-diameter part of the fitting hole 13 with the fitting hole, and the displays 34 are made opposite to the fitting screws 36 having the heads colored.



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1. JP.08-062071,A(1996)
2. JP.10-206263,A(1998)

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## CLAIMS

[Claim(s)]

[Claim 1] Case. It is wrap covering about the interior machine contained by this case and the front face of the above-mentioned case. It is the Bourdon gage equipped with the above, the above-mentioned case The stowage of the above-mentioned interior machine, insertion of \*\*\*\* which opens for free passage to this stowage and carries out opening to a front face, and the attaching screw penetrated to shaft orientations -- with a hole It has the attaching screw inserted in the hole. this insertion -- a hole -- \*\*\*\*\* for sinking the head of a front attaching screw, and insertion -- the above-mentioned interior machine with a back lid The Bourdon tube with which the end was attached in this back lid, and DBMS which changes deformation of this Bourdon tube into the movement of an indicator, It has the dial plate which attends the above-mentioned \*\*\*\* and displays the movement of an indicator, and the conduit with which an end carries out opening to the Bourdon tube, and the other end projects outside through a back lid. It is characterized by what it is attached in the stowage of the above-mentioned case, and the above-mentioned covering makes transparent an opposite part with the above-mentioned \*\*\*\*, and is attached in the case for possible [ removal ].

[Claim 2] nothing [ in the shape of radii ] on the periphery of \*\*\*\* -- the part was made into the diameter-expansion section -- attaching -- a hole -- covering -- the above-mentioned diameter-expansion section -- letting it pass -- insertion -- possible -- anchoring -- the Bourdon gage which indicated what the piece of a stop which has the stop section stopped to a hole is prepared, respectively, it attaches with the above-mentioned stop section, and covering is attached in the case for by the stop with a hole possible to the claim 1 by which it is

[Claim 3] the display with covering transparent in the position which counters \*\*\*\*\* of a case -- having -- this \*\*\*\*\* -- letting it pass -- insertion -- the Bourdon gage which indicated the thing of the attaching screw inserted in the hole colored the head at least to the claim 1 or claim 2 by which it is characterized

[Claim 4] a case -- insertion of an attaching screw -- the Bourdon gage which indicated what the metal interval pipe which constitutes a hole was attached for to either the claim 1 by which it is characterized, or the claim 3

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## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to a Bourdon gage.

[0002]

[Description of the Prior Art] The Bourdon gage attached in the case at the pressure control valve by the attaching screw which contains the interior machine which has DBMS which changes deformation of the Bourdon tube and this Bourdon tube into the movement of an indicator, covers this interior machine with a back lid, and passes along a case and a back lid is known by JP.05-039471.Y. however, the above — during transportation, an attaching screw falls during anchoring, or it loses, and a well-known Bourdon gage has the problem that the workability of anchoring is bad, in order that there may be a place which lacks in the consideration about handling and an attaching screw, a case, and a back lid may dissociate. Moreover, the case where it has a stowage may be damaged by bolting of an attaching screw.

[0003]

[Problem(s) to be Solved by the Invention] The 1st technical problem which this invention tends to solve is to offer a Bourdon gage without fall of an attaching screw, or fear of loss. Moreover, the 2nd technical problem which it is going to solve is to enlarge intensity of the case of the above-mentioned Bourdon gage.

[0004]

[Means for Solving the Problem] The interior machine with which this invention is contained by a case and this case in order to solve the 1st technical problem of the above, It is the Bourdon gage equipped with wrap covering for the front face of the above-mentioned case, the above-mentioned case The stowage of the above-mentioned interior machine, insertion of \*\*\*\* which opens for free passage to this stowage and carries out opening to a front face, and the attaching screw penetrated to shaft orientations — with a hole It has the attaching screw inserted in the hole, this insertion — a hole — \*\*\*\*\* for sinking the head of a front attaching screw, and insertion — the above-mentioned interior machine with a back lid The Bourdon tube with which the end was attached in this back lid, and DBMS which changes deformation of this Bourdon tube into the movement of an indicator, It has the dial plate which attends the above-mentioned \*\*\*\* and displays the movement of an indicator, and the conduit with which an end carries out opening to the Bourdon tube, and the other end projects outside through a back lid. In attaching [ are attached in the stowage of the above-mentioned case, and / covering / the above-mentioned covering makes transparent an opposite part with the above-mentioned \*\*\*\*, and / in a case ]-possible [ removal ];, or this Bourdon gage The shape of radii is made, and the part was made into the diameter expansion section, and is attached in the periphery of \*\*\*\* in a case, a hole It is characterized by preparing the piece of a stop which has the stop section which can insert in covering through the above-mentioned diameter expansion section, attaches, and is stopped to a hole, respectively, attaching with the above-mentioned stop section, and covering being attached in a case by the stop with a hole possible [ removal ].

[0005] moreover, the display with covering of the above-mentioned Bourdon gage transparent in the position which counters \*\*\*\*\* of a case in order to solve the same technical problem — having — this \*\*\*\*\* — letting it pass — insertion — it is characterized by the thing of the attaching screw inserted in the hole colored the head at least

[0006] in order [ furthermore, ] to solve the 2nd technical problem of the above — the case of these Bourdon gages — insertion of an attaching screw — it is characterized by attaching the metal interval pipe which constitutes a hole

[0007]

[Function and Effect(s) of the Invention] insertion of a case — the attaching screw inserted in the hole from the \*\*\*\*\* side can prevent the defluxion and loss of an attaching screw which can boil and set the front face of a case during transportation and anchoring since it is stopped with wrap covering and does not drop out of a case. Moreover, since \*\*\*\* prepared in the case is covered by covering, a foreign matter does not invade in a case through \*\*\*\*, if covering is removed from a case — the above-mentioned insertion — \*\*\*\* of a case will be closed by covering, if a pressure gage can be attached in a desired hydrostatic-pressure device and covering after anchoring is again attached in a case by the attaching screw inserted in the hole Since the head is sunk from the front face of a case by \*\*\*\*\* prepared in the case, the obstacle and bird clapper of covering attachment and detachment of an attaching screw do not have the above-mentioned attaching screw.

[0008] moreover — while preparing the display which made transparent \*\*\*\*\* of a case, and the position which counters in covering — \*\*\*\*\* — letting it pass — insertion — the display of the attaching screw made to insert in a hole prepared in covering using the attaching screw since it was colored the head at least can be displayed clearly

[0009] furthermore, a case — insertion of an attaching screw — since the intensity of a case becomes large by having attached the metal interval pipe which constitutes a hole, breakage of the case by bolting of an attaching screw can be prevented

[0010]

[Example] Drawing 1 or drawing 6 showed the example of this invention, and this Bourdon gage 1 is equipped with a case 2, the interior machine 3 contained by this case 2, and the covering 4 attached in the front face of a case 2. The above-mentioned case 2 is equipped with the stowage 6 (refer to drawing 2 ) of the cross-section simultaneously round shape for containing the above-mentioned interior machine 3 for a transverse-plane \*\*\*\*\* square to nothing and the interior, in the front face by the side of covering 4 The needle anchoring section 7 more nearly annular than a stowage 6 in a minor diameter, The frame-like protrusion wall 9 (refer to drawing 2 ) with which \*\*\*\* 8 surrounded by this needle anchoring section 7 surrounds the rear face of the interior machine 3 to an opposite side is formed, respectively, gets down, and is fabricated by synthetic resin at one. The sign 28 in drawing 1 shows the pressure range setting needle attached in arbitrary positions [ move / and / it ] possible / a halt / along with the needle anchoring section 7.

[0011] The metal interval pipes 10 and 10 are pressed fit in shaft orientations, and \*\*\*\*\* 11 and 11 for sinking into the fitting location of the interval pipes 10 and 10 in a front face the head of the attaching screw which carries out a postscript is formed in the diagonal section of the couple in a case 2. circular anchoring for attaching covering 4 in the method of the outside of the direction of a path of the needle anchoring section 7, as shown in other diagonal sections in the front face of the above-mentioned case 2 at drawing 3 — holes 13 and 13 attach with \*\*\*\*\* 11 and 11, and the circular guide slot 14 and .. form among holes 13 and 13, respectively — having — anchoring — the diameter expansion sections 13a and 13a are formed in the circumferencial direction end of holes 13 and 13

[0012] The interior machine 3 was equipped with the metal back lid 16, the \*\*\*\*-like Bourdon tube 17 with which the end was fixed to this back lid 16, a conduit 18 (refer to drawing 2 ), DBMS (illustration ellipsis) which changes deformation of the Bourdon tube 17 into the movement of an indicator 19, and the dial plate 20 which displays the movement of this indicator 19, carried out opening of the end of a conduit 18 to the Bourdon tube 17, and the other end penetrated the back lid 16 airtightly, and it has projected it. Therefore, if the Bourdon tube 17 deforms by pneumatic pressure, the deformation is changed into the movement of an indicator 19, and can read the pneumatic pressure with the graduation of a dial plate 20.

the attaching screw which carries out a postscript to the diagonal section of the lot in the back lid 16 passes — it attaches in the diagonal section of the group of others [ holes / 23 and 23 ] by slitting 24 and 24, and pieces 25 and 25 are formed in it, respectively the stop which these pieces 25 and 25 of anchoring have the stop sections 26 and 26 at the nose of cam made slightly crooked in a case 2 side, and formed the stop sections 26 and 26 in the case 2 — (referring to drawing '5 ) and the interior machine 3 are attached in a stowage 6 by stopping to holes 12 and 12 in addition — although illustration is omitted — the back lid 16 — the above-mentioned insertion — cutting and lacking the establishment part of holes 23 and 23 — insertion of a screw thread — holes 23 and 23 are omissible In this case, the shaft-orientations length of the interval pipes 10 and 10 is lengthened a little so that it may become the same flat surface as the rear face of the back lid 16.

[0014] The case 2 side of the above-mentioned covering 4 equips with the pieces 31 and 31 of a stop which have the stop sections 32 and 32 which attach at a nose of cam and are stopped to holes 13 and 13, and the guide slot 14 and two or more guide sections (illustration ellipsis) loosely inserted in ... indication 34 and 34 prepared in the part which counters \*\*\*\* 8, and the part which counters \*\*\*\*\* 11 and 11 is given transparent, and other parts are colored a case 2 and the same color.

[0015] the above-mentioned example builds the interior machine 3 into the stowage 6 of a case 2, and shows it to drawing 5 — as — the stop sections 26 and 26 of the pieces 25 and 25 of anchoring of backing 16 — a stop of a case 2 — if holes 12 and 12 are stopped, the interior machine 3 will be attached to a case 2 moreover — if the side attachment wall of a stowage 6 is made to deform into the method of outside slightly — the stop sections 26 and 26 and a stop — since a stop of holes 12 and 12 is canceled, the interior machine 3 can be picked out from a case 2 Furthermore, after inserting the attaching screws 36 and 36 which colored the head at least the interval pipes 10 and 10 of a case 2, If the stop sections 32 and 32 of the pieces 31 and 31 of a stop prepared in covering 4 are attached, the guide section is inserted in the diameter expansion sections 13a and 13a of holes 13 and 13 at the guide slot 14 and ..., respectively (refer to drawing 4 A) and covering 4 is rotated in the predetermined direction The stop sections 32 and 32 attach, it stops to holes 13 and 13, covering 3 is attached in the front face of a case 2 (refer to this drawing B), and the displays 34 and 34 of covering 4 counter with \*\*\*\*\* 11 and 11 of a case 2. Therefore, the displays 34 and 34 given transparent can be clarified by having colored the head of attaching screws 36 and 36.

[0016] Since the head of the attaching screws 36 and 36 which inserted the above-mentioned case 2 in the interval pipes 10 and 10 is sunk by \*\*\*\*\* 11 and 11 from the front face of a case 2, there are no obstacle and bird clapper of attachment and detachment of attaching screws 36 and 36 of covering 4. Moreover, since the attaching screws 36 and 36 inserted in the interval pipes 10 and 10 from \*\*\*\*\* 11 and 11 side are stopped by the covering 4 attached in the case 2 and do not slip out of a case 2, they can prevent the fall and loss at the time of the inside of transportation, or anchoring.

[0017] Drawing 7 shows the use mode which attached above-mentioned Bourdon gage 1 in the pressure control valve 40 which is an example of a hydrostatic-pressure equipment. This pressure control valve 40 is equipped with the anchoring port 50 of the pressure gage which is open for free passage to a hydrostatic-pressure test section (output port), and the crevice 51 formed in opening of this anchoring port 50, and the seal ring (O ring) 52 is attached in this crevice 51. However, with above-mentioned Bourdon gage 1, the hydrostatic-pressure device by which pneumatic pressure is measured is not limited to the pressure control valve of illustration, and contains other hydrostatic-pressure devices, such as a hydrostatic-pressure actuator.

[0018] If the lobe of the conduit 18 which projects from the back lid 16 is attached through a seal ring 52 and inserted in a port 50, the above-mentioned example The seal of the side attachment wall of a crevice 51 and the periphery side of a conduit 18 is airtightly carried out by the seal ring 52, and covering 4 is removed from a case 2 to the back before the insertion to the seal ring 52 of a conduit 18 by it. If the pressure control valve 40 which is omitting illustration \*\*\*\*\* attaching screws 36 and 36 and it binds tight to a hole, Bourdon gage 1 will be attached in a pressure control valve 40, will attach covering 4 in a case 2 again after that, and will close \*\*\*\* 8. Since a seal will be carried out in the direction of a path of a seal ring if it puts in another way, bolting of attaching screws 36 and 36 is the inside-and-outside peripheral surface of a seal ring 52, and for only attaching a pressure gage 1, and the seal by the above-mentioned seal ring 52 does not need to press and carry out the seal of the seal ring 52 to shaft orientations.

[0019] Since the air of the hydrostatic-pressure test section in a pressure control valve 40 flows into the Bourdon tube 17 through a conduit 18, the deformation is changed into the movement of an indicator 19 by DBMS and the movement is displayed on a dial plate 21, above-mentioned Bourdon gage 1 can measure the pneumatic pressure of output port A.

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## DESCRIPTION OF DRAWINGS

### [Brief Description of the Drawings]

[Drawing 1] It is the decomposition perspective diagram of an example.

[Drawing 2] It is the important section decomposition perspective diagram seen from the opposite side of drawing 1 .

[Drawing 3] It is the important section enlarged view of covering.

[Drawing 4] A and B are the expanded sectional views showing the stop state of covering and a case.

[Drawing 5] It is the expanded sectional view showing the stop state of backing and a case.

[Drawing 6] It is the expanded sectional view showing the relation between a case, an interval pipe, and an attaching screw.

[Drawing 7] It is the expanded sectional view showing an example of a use mode.

### [Description of Notations]

1 Bourdon Gage

2 Case

3 Interior Machine

4 Covering

6 Stowage

8 \*\*\*\*

10 Interval Pipe

11 \*\*\*\*\*

13 Attach and it is Hole.

13a Diameter expansion section

16 Back Lid

17 Bourdon Tube

18 Conduit

19 Indicator

20 Dial Plate

31 Piece of Stop

32 Stop Section

34 Display

36 Attaching Screw

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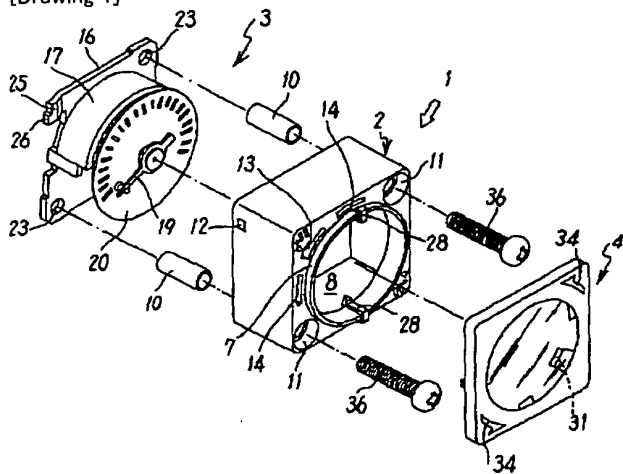
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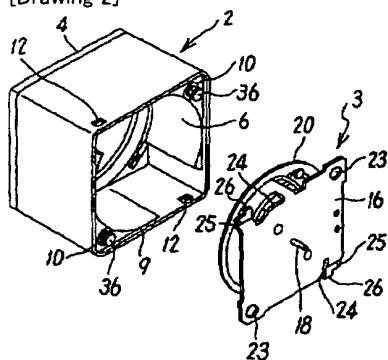
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## DRAWINGS

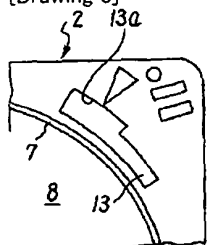
[Drawing 1]



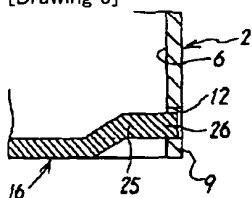
[Drawing 2]



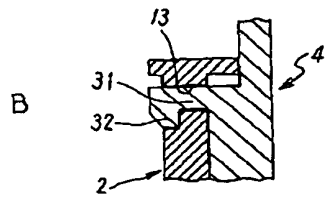
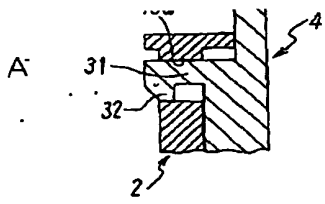
[Drawing 3]



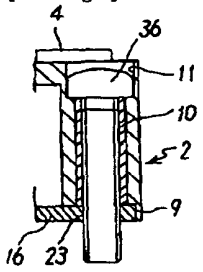
[Drawing 5]



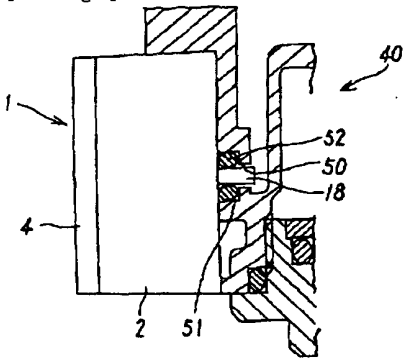
[Drawing 4]



[Drawing 6]



[Drawing 7]



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